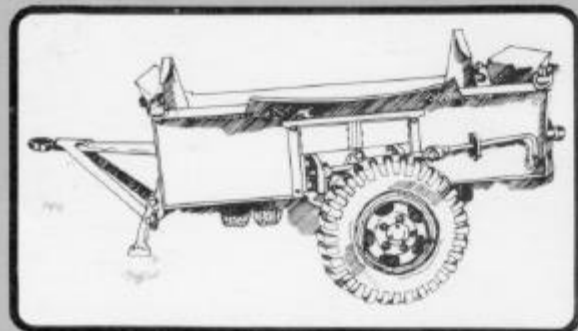
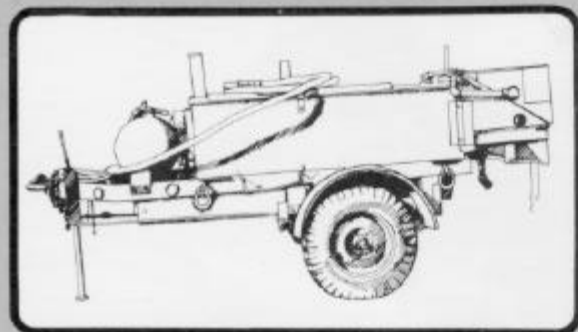
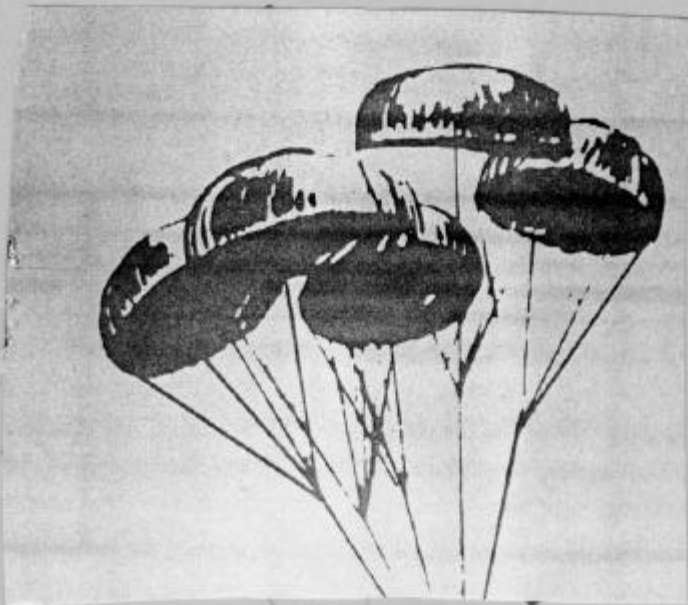


ARMY FM 10-546  
AIR FORCE TO 13C7-33-21

# AIRDROP OF SUPPLIES AND EQUIPMENT RIGGING AGGREGATE SPREADER AND HEATING KETTLE TRAILERS



DEPARTMENTS OF THE ARMY AND THE AIR FORCE

**FIELD MANUAL**  
**NO. 10-546**  
**TECHNICAL ORDER**  
**NO. 13C7-33-21**

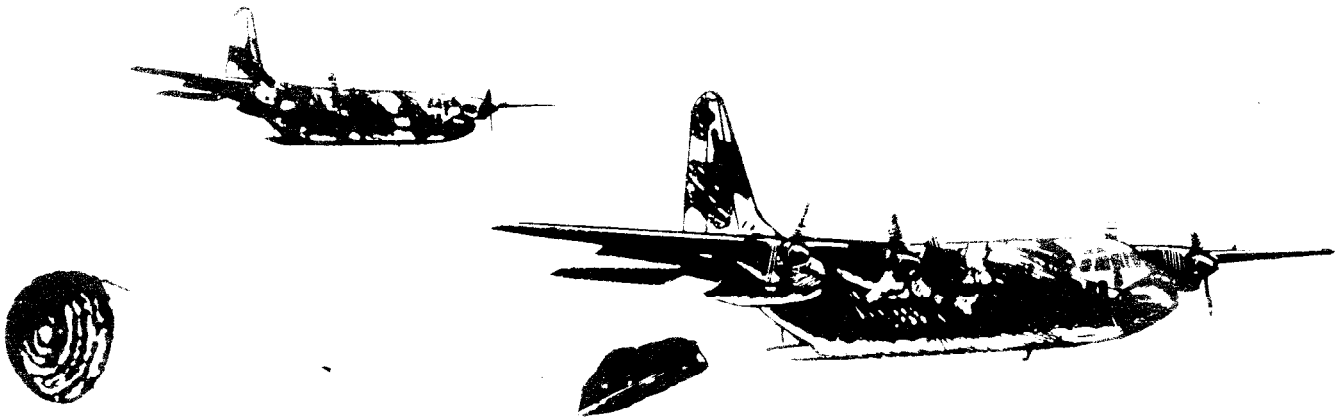
**DEPARTMENTS OF THE ARMY**  
**AND THE AIR FORCE**  
 Washington DC, 22 May 1981

# **AIRDROP OF SUPPLIES AND EQUIPMENT RIGGING AGGREGATE SPREADER AND HEATING KETTLE TRAILERS**

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## CHAPTER 1

# *INTRODUCTION*

### **1-1. Scope**

This manual tells and shows how to rig the aggregate spreader and bitumen heating kettle trailers together for LAPES airdrop from the C-130 aircraft.

### **1-2. Special Considerations**

*a.* These loads will include a hazardous material, gasoline. The load must be marked and labeled according to AFR 71-4/TM 38-250.

*b.* A copy of this manual must be made available to the joint airdrop inspectors during the before- and after-loading inspections.

### 1-3. Recommended Changes

You are encouraged to report any errors or omissions and suggest ways for making this a better manual. Army personnel, send your comments on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to:

**Commandant  
US Army Quartermaster School  
ATTN: ATSM-TDT  
Fort Lee, Virginia 23801**

Air Force personnel, send your reports on AFTO Form 22 (Technical Order Publication Improvement Report). Send the reports through:

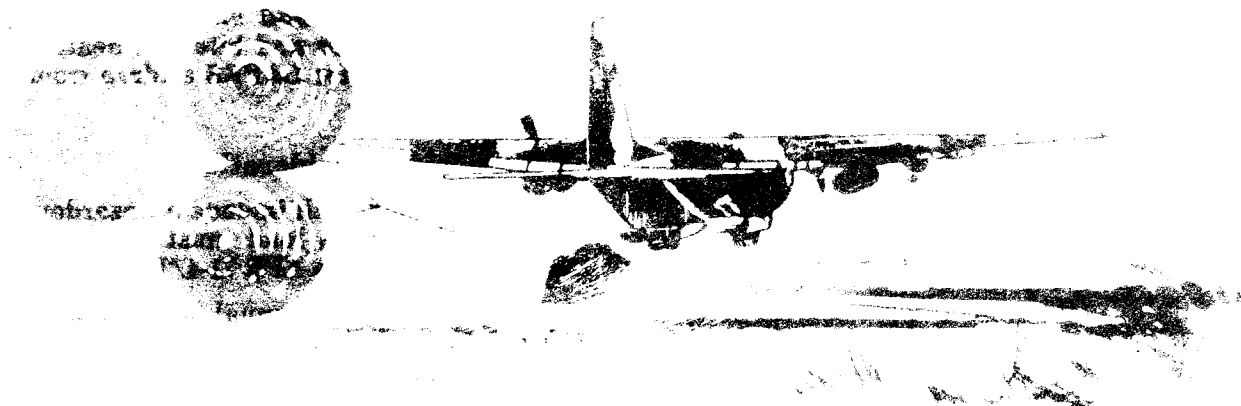
**Headquarters  
Military Airlift Command  
(MAC/DOVT)  
Scott AFB, Illinois 62225**

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US Army Quartermaster School  
ATTN: ATSM-TDT  
Fort Lee, Virginia 23801**

Also send an info copy of AFTO Form 22 to:

**San Antonio ALC/MMEDTR  
Kelly AFB, Texas 78241**



## CHAPTER 2

# ***RIGGING PROCEDURES***

### **2-1. Description of Load**

The aggregate spreader trailer and bitumen heating kettle trailer are rigged together on a 20-foot LAPES/AD platform. The unrigged spreader trailer weighs 2,250 pounds and it is 142 inches long (reducible to 110 inches), 55 inches high, and 75 inches wide. The kettle trailer weighs 1,900 pounds; it is 146 inches long, 66 inches high (reducible to 60 inches), and 56 inches wide. The trailers are rigged with two 55-gallon drums of asphalt, weighing a total of 880 pounds.

### **2-2. Preparing Platform**

*a. Inspecting Platform.* Inspect, or assemble and inspect, the 20-foot LAPES/AD platform as outlined in TM 1670-208-20&P/TO 13C3-4-12.

*b. Attaching Bridle Plates and Clevises.* Bolt 4 bridle plates and 30 load tiedown clevises to the platform as shown in figure 2-1. Number the tiedown clevises as shown in figure 2-1.

### **2-3. Building and Placing Honeycomb Stacks**

Build the honeycomb stacks and place them on the platform as shown in figure 2-2.

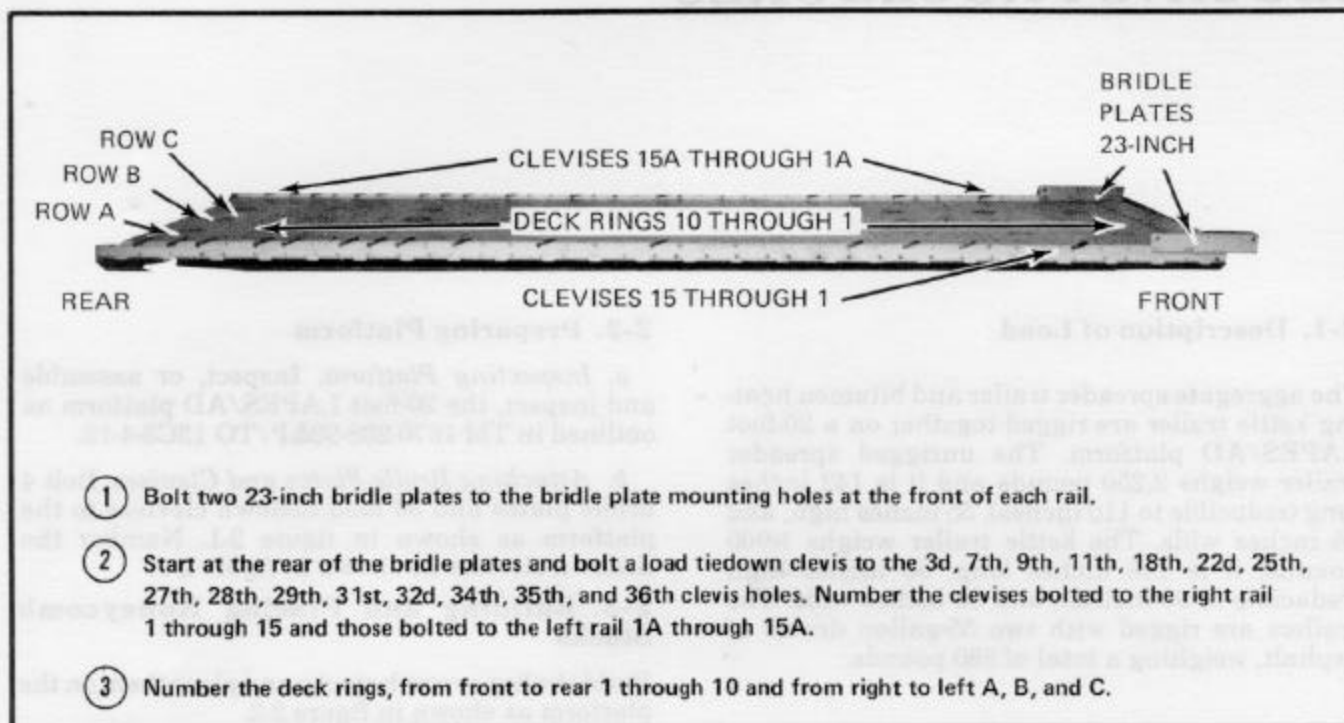


Figure 2-1. Platform prepared.

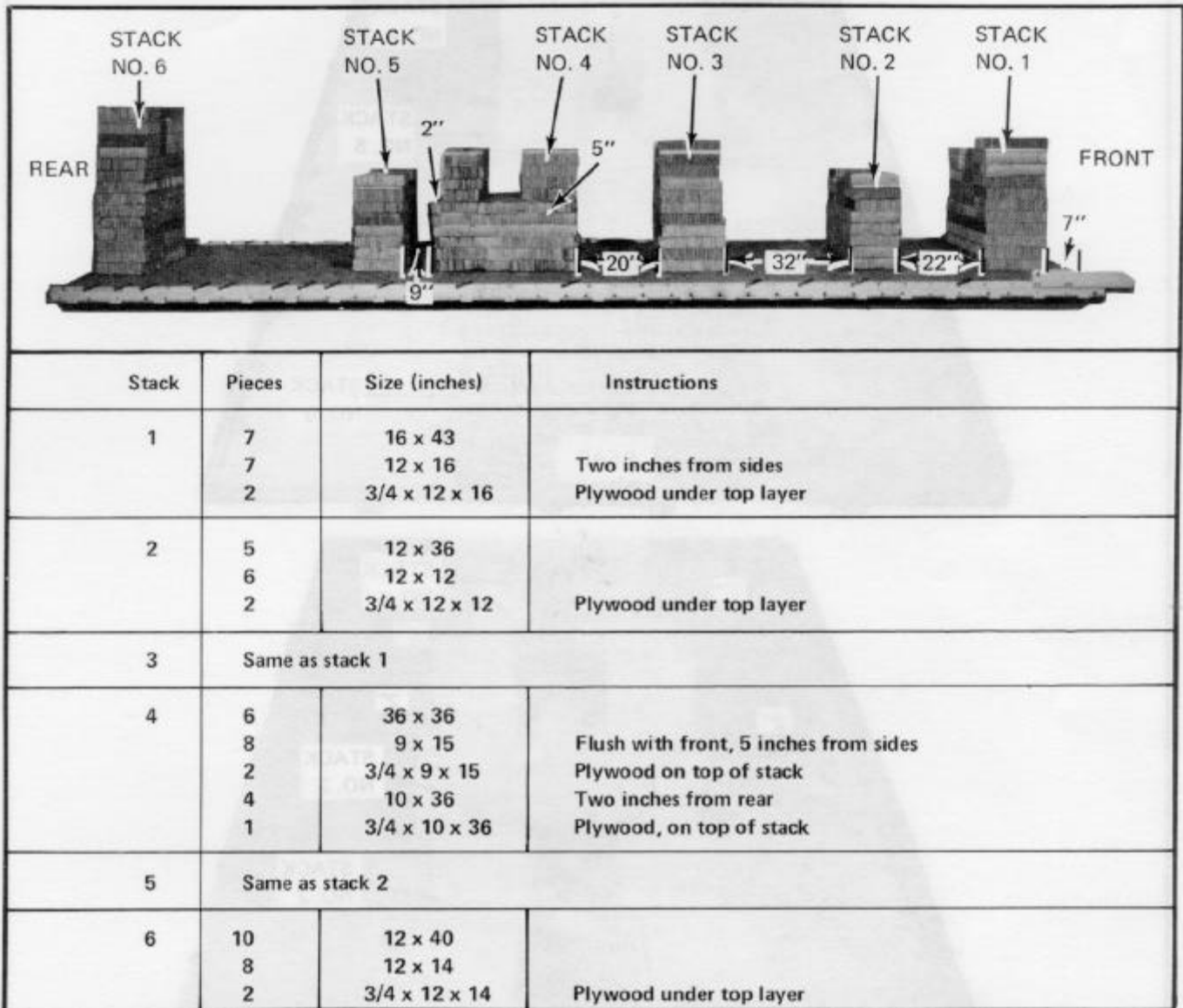


Figure 2-2. Honeycomb stacks positioned.



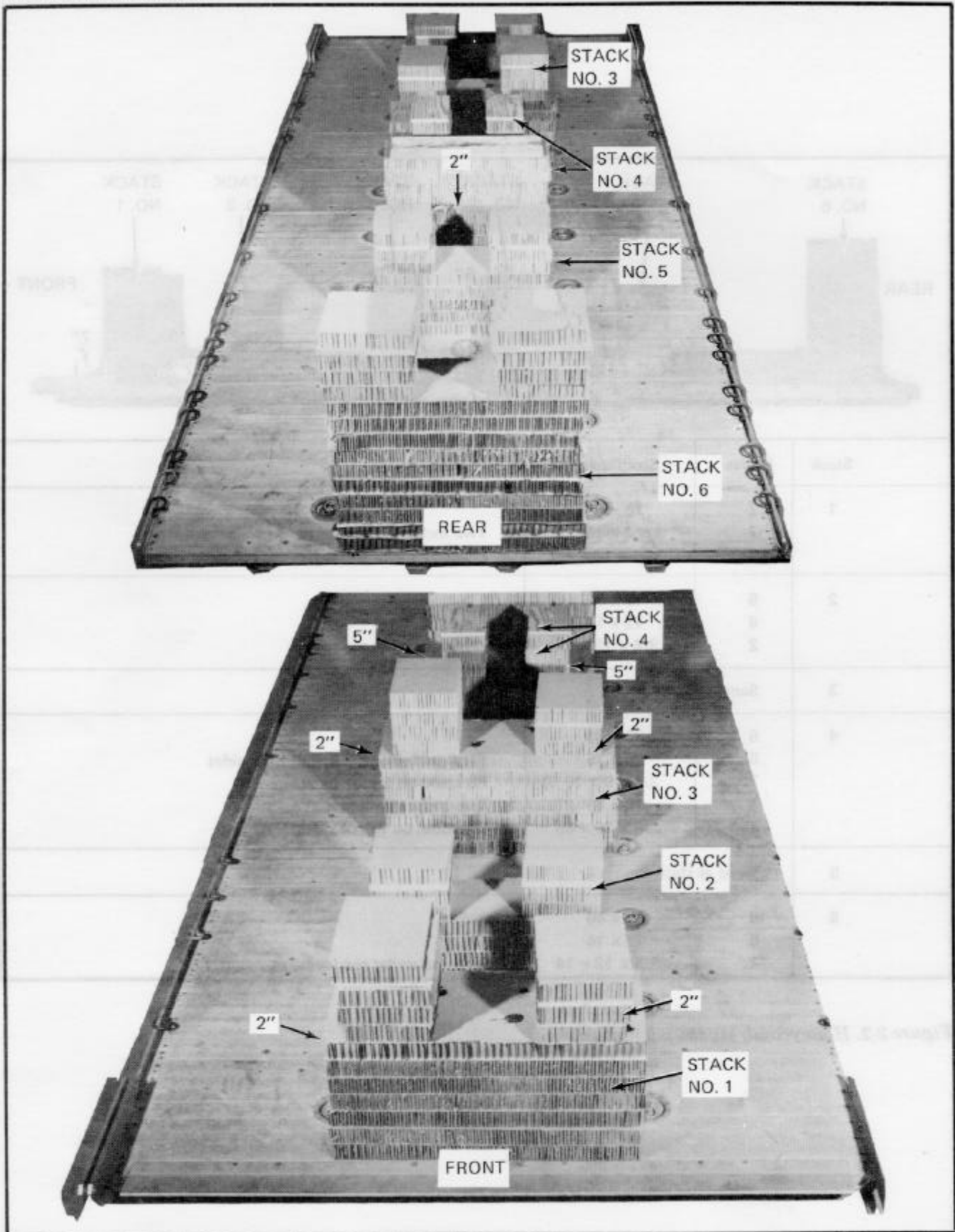


Figure 2-2. Honeycomb stacks positioned (continued).

## 2-4. Preparing Trailers

a. *Preparing Spreader Trailer.* Prepare the spreader trailer as shown in figures 2-3 through 2-6.

b. *Preparing Kettle Trailer.* Prepare the kettle trailer as shown in figures 2-7 through 2-9.

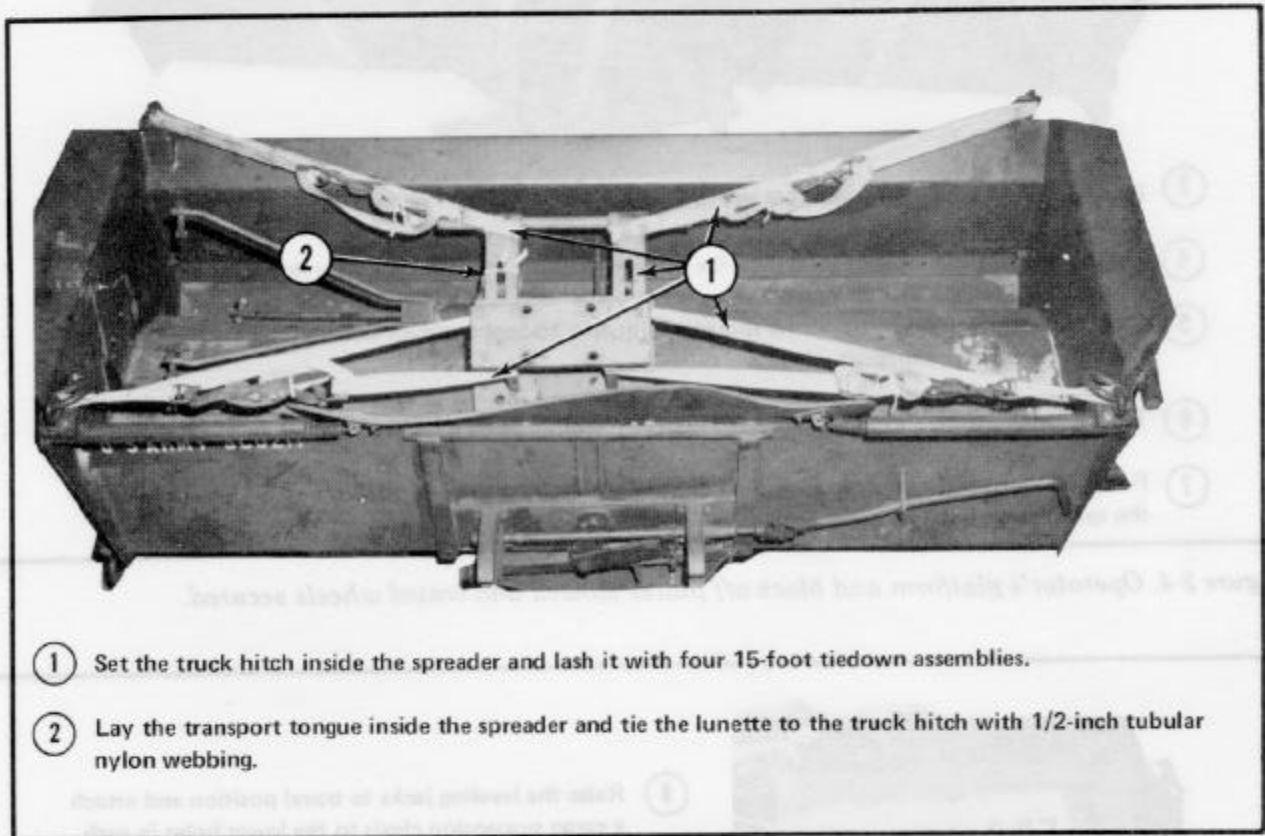
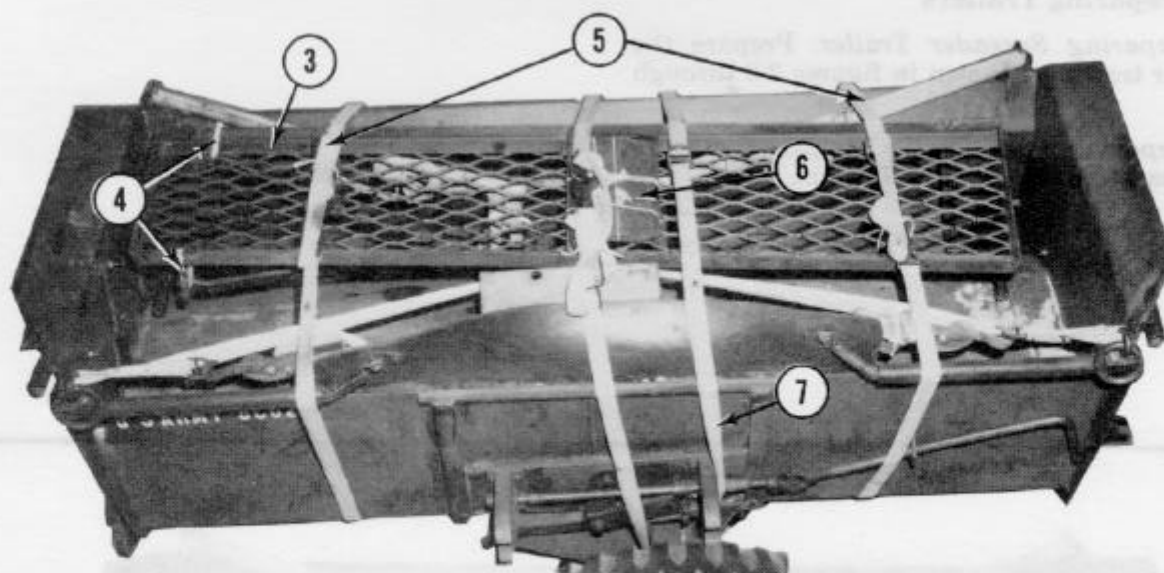
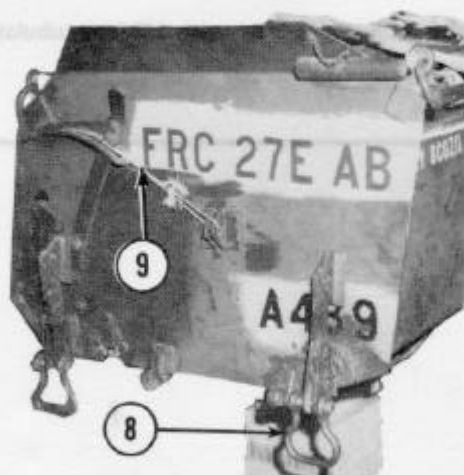


Figure 2-3. Truck hitch and transport tongue stowed in spreader.



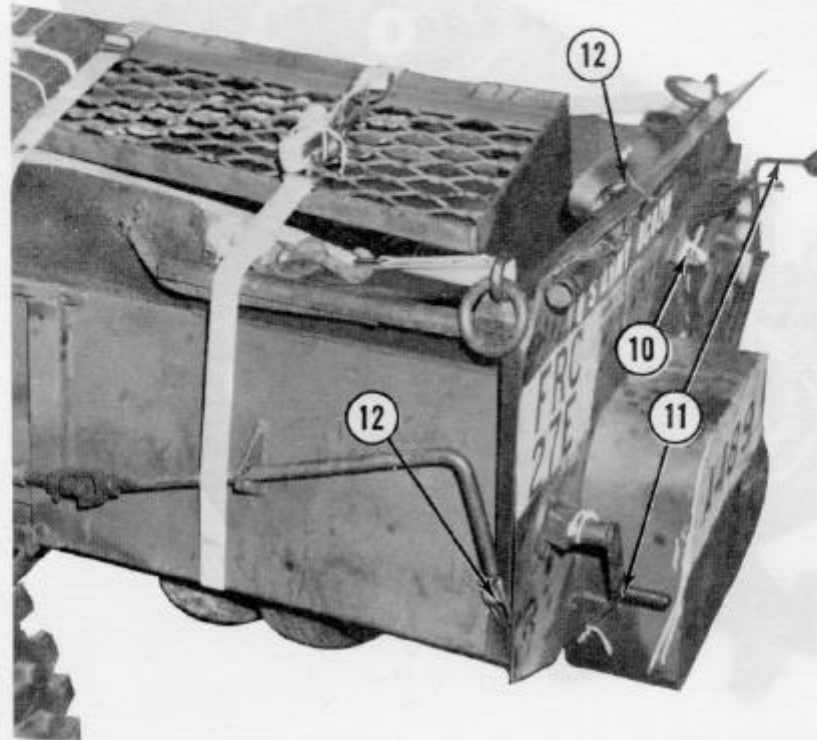
- ③ Place the operator's platform inside the spreader.
- ④ Tie the rear of the transport tongue to the operator's platform with type III nylon cord.
- ⑤ Lash the operator's platform to the spreader with two 15-foot tiedown assemblies. Pass the lashings between the support wheels.
- ⑥ Tie the block off plates to the operator's platform with type III nylon cord.
- ⑦ Form a 30-foot tiedown strap according to FM 10-500/TO 13C7-1-5. Lash the travel wheels to the spreader with the strap.

Figure 2-4. Operator's platform and block off plates stowed and travel wheels secured.



- ⑧ Raise the leveling jacks to travel position and attach a cargo suspension clevis to the lower holes in each jack bracket.
- ⑨ Tie the shutter lever in place with type III nylon cord.

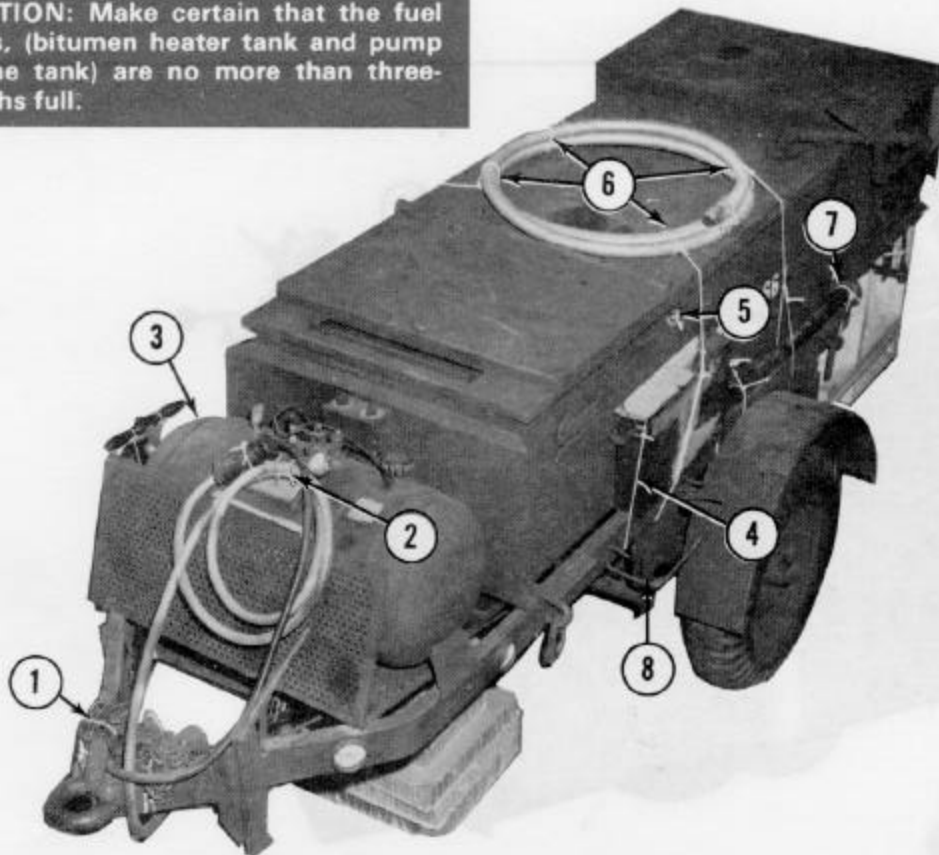
Figure 2-5. Front of spreader prepared.



- ⑩ Tie the shutter lever in place with type III nylon cord.
- ⑪ Safety the clutch control and hitch adjusting handles with type III nylon cord.
- ⑫ Fit two D-rings on a 16-foot length of type X nylon webbing. Pass the nylon around the rear of the spreader. Position the two D-rings 5 inches up on each side. Place two additional D-rings on the webbing and hook them together on top with a load binder.

*Figure 2-6. Rear of the spreader prepared.*

**CAUTION:** Make certain that the fuel tanks, (bitumen heater tank and pump engine tank) are no more than three-fourths full.



- ① Tie the safety chains to the drawbar frame with type III nylon cord.
- ② Tie the intervehicular cable and fuel hose assembly on top of the burner fuel tank with type III nylon cord.
- ③ Safety the burner assembly fuel line in place with type III nylon cord.
- ④ Remove the stack and tie it to the frame with type III nylon cord.
- ⑤ Tie the kettle cover down with type III nylon cord.
- ⑥ Tie the spray hose on top of the kettle with four lengths of type III nylon cord.
- ⑦ Remove the front and rear support legs and tie one to the trailer frame on each side.
- ⑧ When the wheel blocks are available, tie them in their bracket with type III nylon cord.

**Note:** The spray bar assembly is tied in its bracket on the right side of the kettle with type III nylon cord.

*Figure 2-7. Heating kettle prepared.*

# **MATERIALS:**

## **Lumber**

2" X 4" X 25" -2 each

## **Plywood**

3/4" X 16" X 39" -1 each (bottom)

3/4" X 13" X 18 1/2" -2 each (left rear)

3/4" X 14" X 18 1/2" -2 each (right rear)

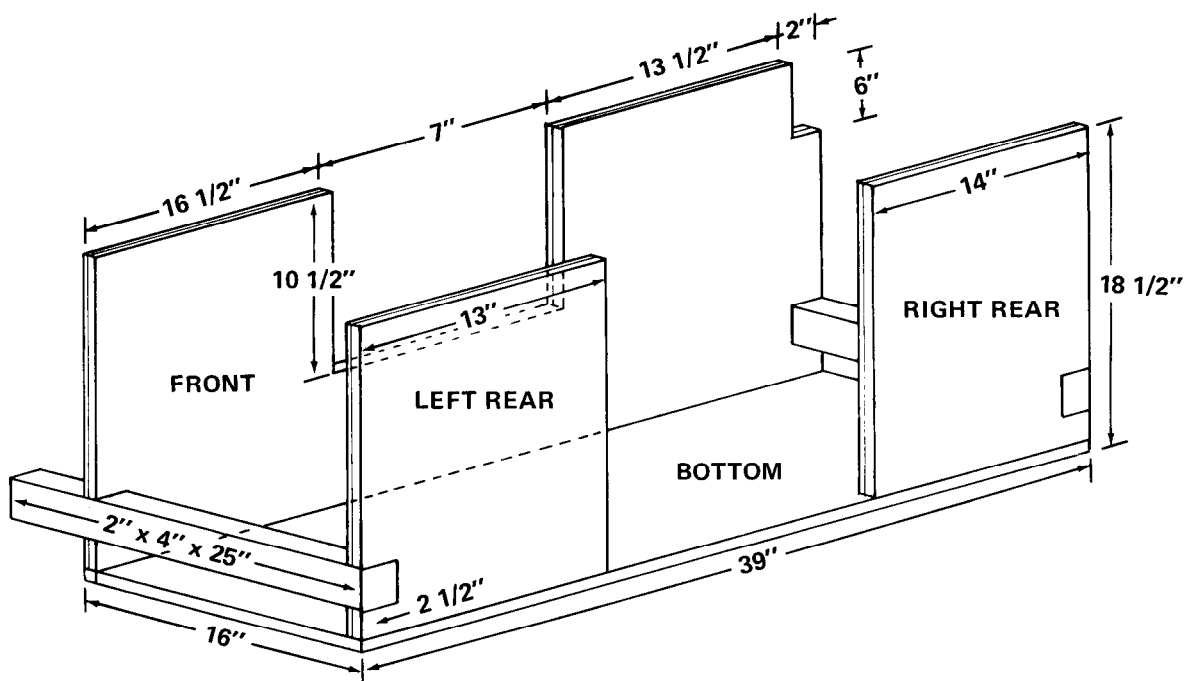
3/4" X 18 1/2" X 39" -2 each (front)

## **Nails**

6d -as required

10d -as required

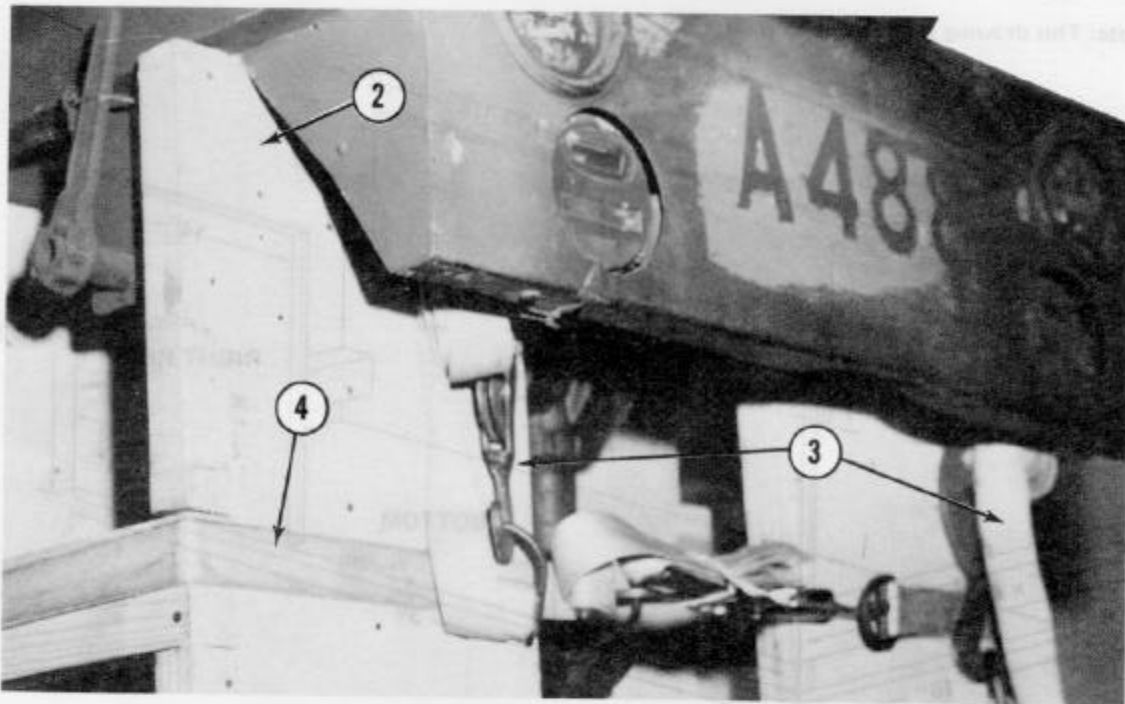
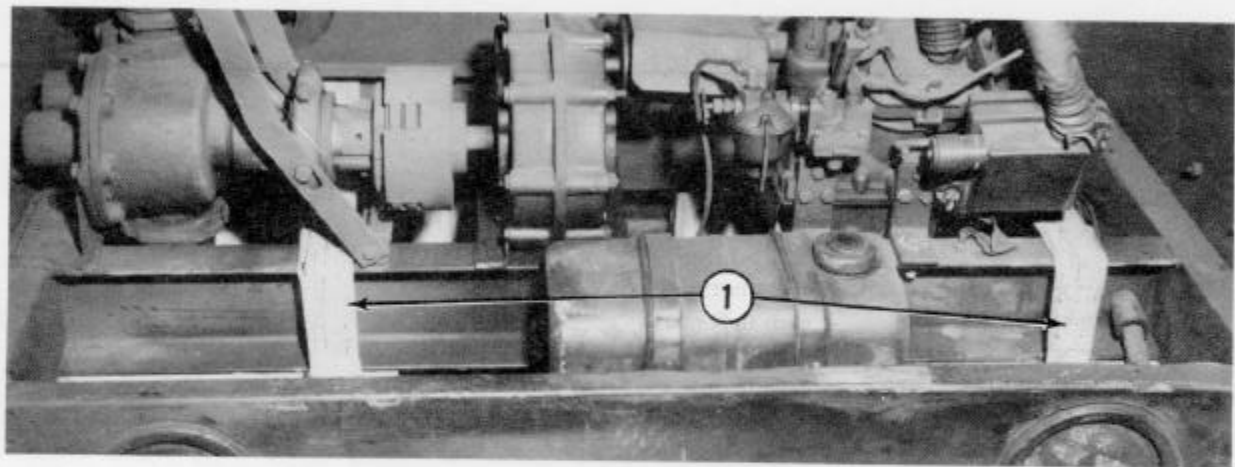
Note: This drawing is not made to scale.



Note: This engine support is positioned the way it is placed under the rear of the trailer.

Figure 2-8. Construction details for engine support.





- ① Pass two tiedown straps up over the engine support rails and let the ends fall free.
- ② Fit the engine support under the rear of the trailer.
- ③ Use two D-rings, two load binders and the straps installed in 1 above to lash the engine support in place.
- ④ Pass another tiedown strap around the engine support in front of the rear spring shackles and hook the ends together with a D-ring and load binder.

Figure 2-9. Engine support installed.

## 2-5. Stowing Drums of Asphalt

Build the endboards of 3/4-inch plywood as shown in figure 2-10. Stow the drums of asphalt on the platform as shown in figure 2-11.

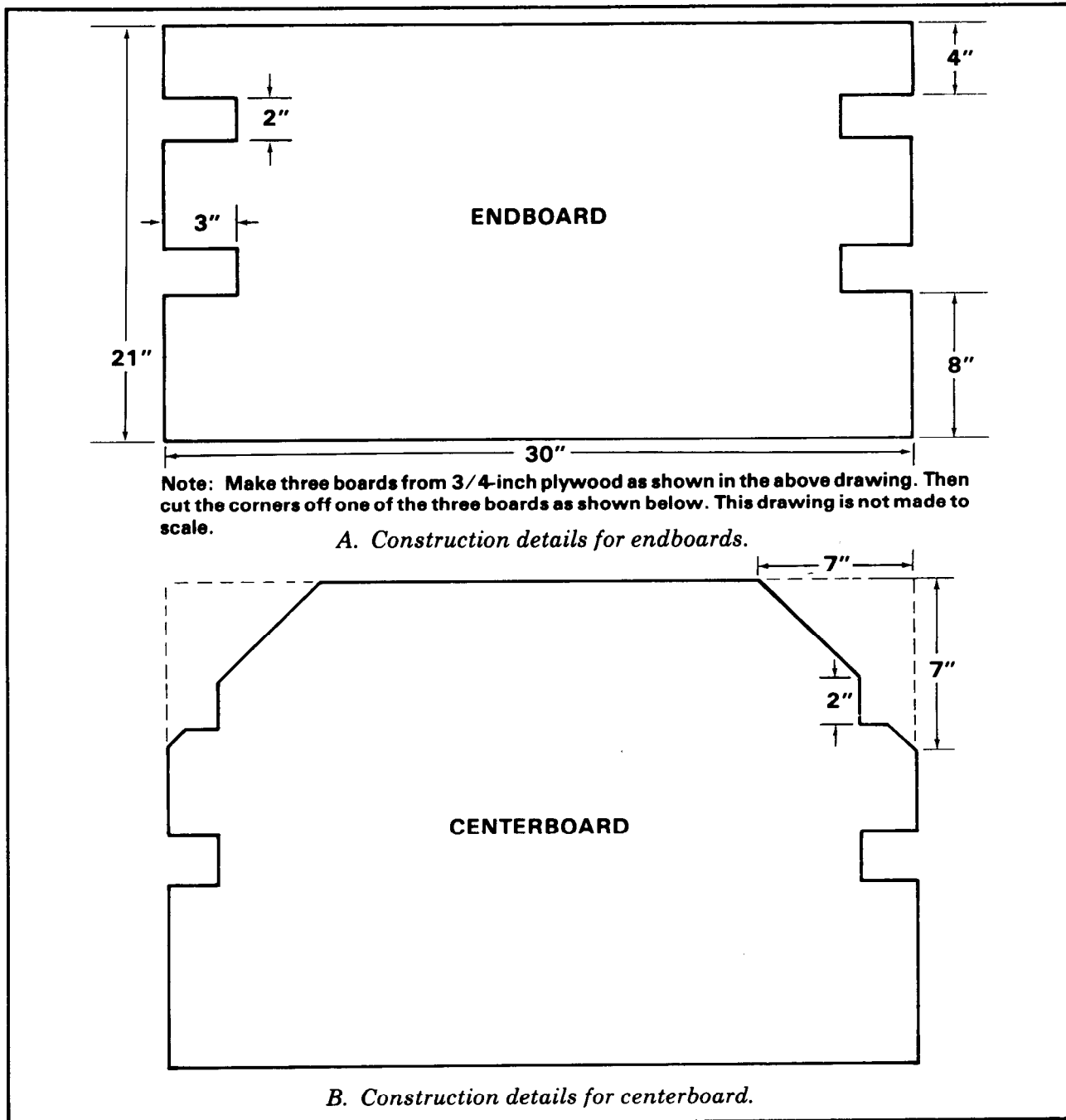
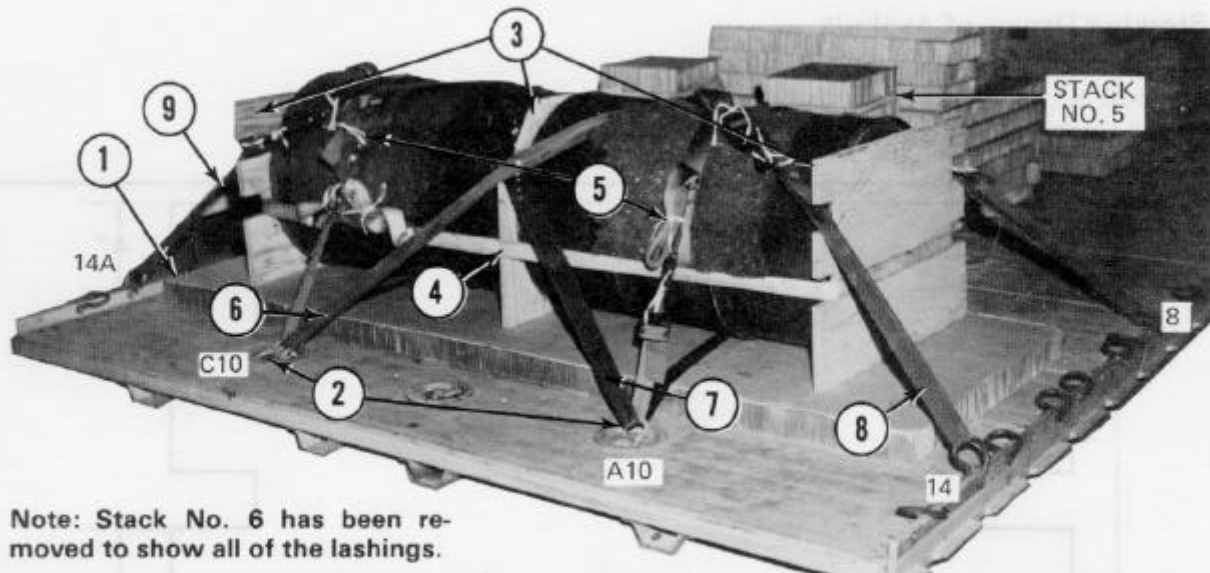


Figure 2-10. Construction details for endboards and centerboard.



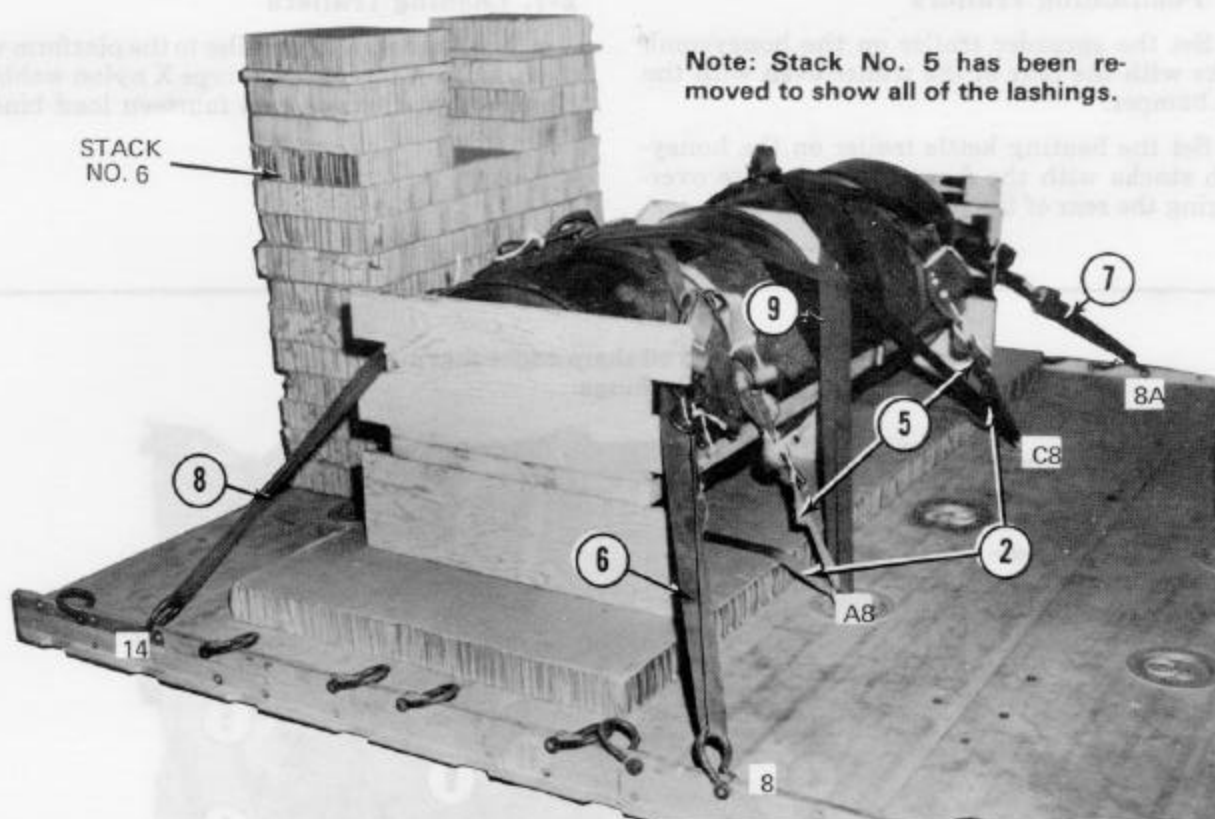


**Note:** Stack No. 6 has been removed to show all of the lashings.

- ① Lay a 36- by 96-inch piece of honeycomb across the platform 18 inches from the rear of the platform.
- ② Place four 16-foot lengths of type X nylon webbing across the honeycomb for use in lashing the drums. Pass one lashing through tiedown ring A8, one through C8, one through A10, and one through C10.
- ③ Center two drums of asphalt on the honeycomb with the centerboard between them. Set the endboards against the outside ends of the drums.
- ④ Form a 30-foot tiedown strap according to FM 10-500/TO 13C7-1-5. Pass the lashing through the lower notches in the boards around the drums and install two D-rings and a load binder.
- ⑤ Pass the lashings (2, above) around the drums and hook both ends together with two D-rings and a load binder.

**Note:** Use cellulose wadding or felt under the load binders to prevent metal to metal contact.

*Figure 2-11. Asphalt drums stowed on platform.*



Use four 16-foot lengths of type X nylon webbing, eight D-rings, and four load binders for steps 6 through 9.

- ⑥ Pass strap through 8, through notch, over drums, through C10, and hook load binder.
- ⑦ Pass strap through 8A, through notch, over drums, through A10, and hook load binder.
- ⑧ Pass strap through 14, through notch, over drums, through C8, and hook load binder.
- ⑨ Pass strap through A14, through notch, over drums, through A8, and hook load binder.

Figure 2-11. Asphalt drums stowed on platform (continued).

## 2-6. Positioning Trailers

a. Set the spreader trailer on the honeycomb stacks with the rear of the trailer even with the nose bumper.

b. Set the heating kettle trailer on the honeycomb stacks with the front of the lunette overhanging the rear of the platform 16 inches.

## 2-7. Lashing Trailers

a. Lash the spreader trailer to the platform with fourteen 16-foot lengths of type X nylon webbing, twenty-eight D-rings, and fourteen load binders (fig 2-12).

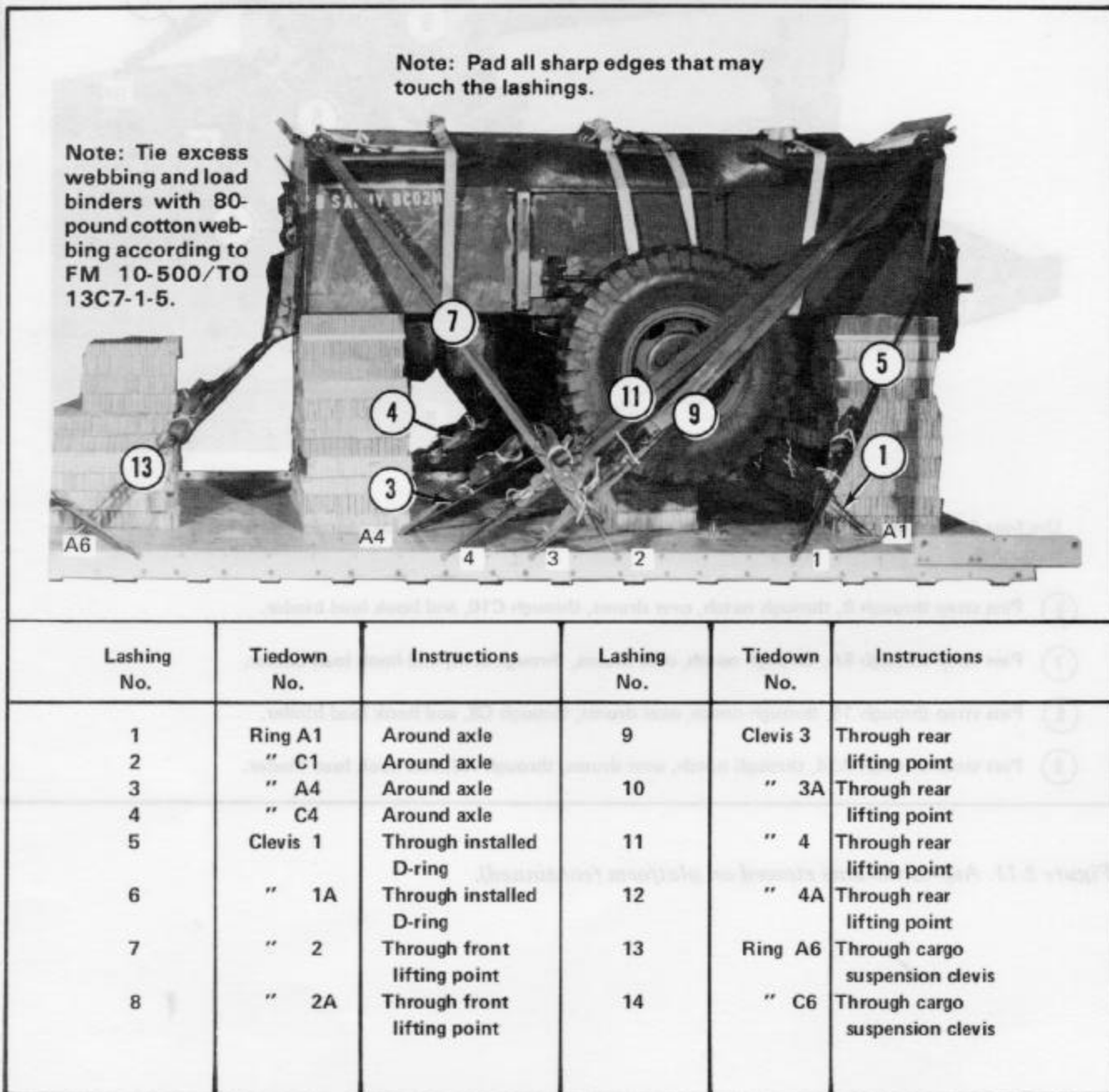
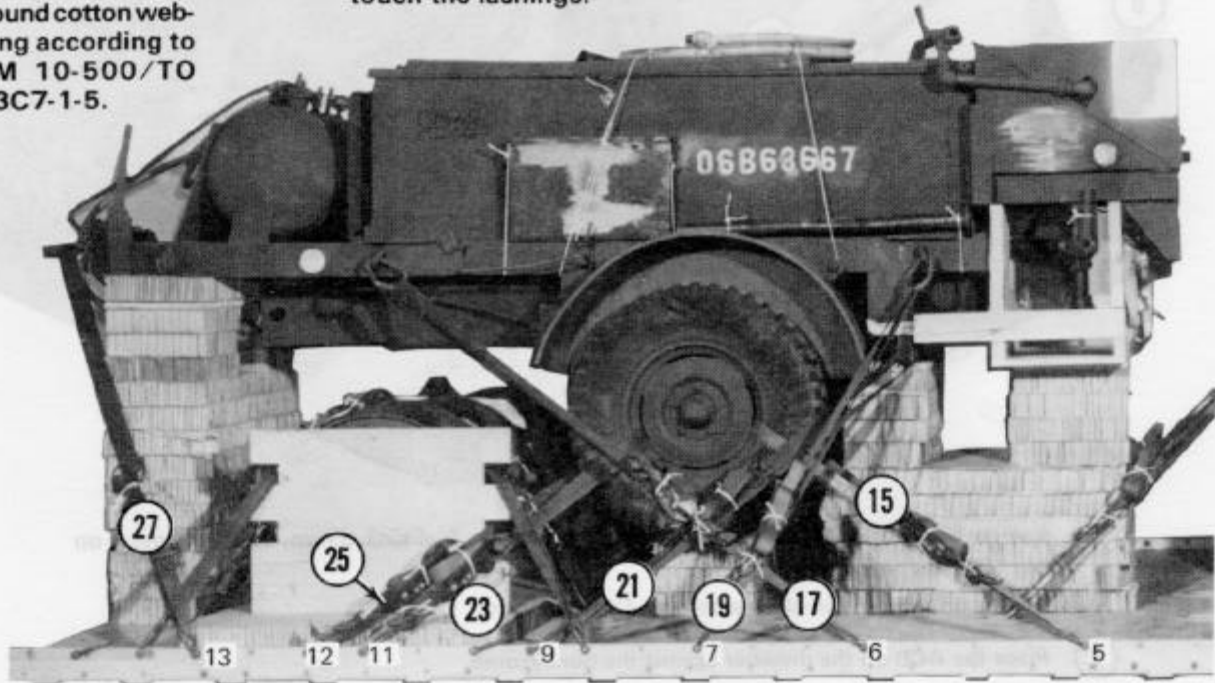


Figure 2-12. Spreader trailer lashed to platform.

b. Lash the heating kettle trailer to the platform with fourteen 16-foot lengths of type X nylon webbing, twenty-eight D-rings, and fourteen load binders (fig 2-13).

**Note:** Tie excess webbing and load binders with 80-pound cotton webbing according to FM 10-500/TO 13C7-1-5.

**Note:** Pad all sharp edges that may touch the lashings.

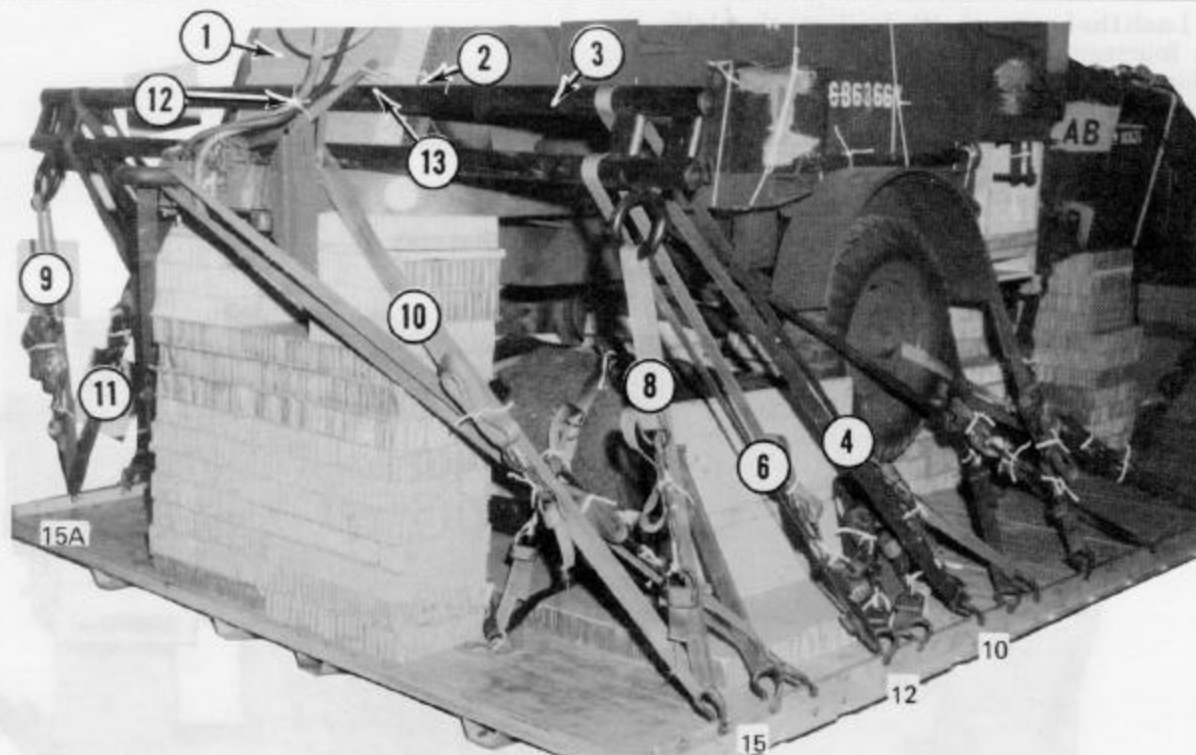


Lashing No.	Tiedown No.	Instructions
15	5	Through wheel
16	5A	Through wheel
17	6	Through front lifting point
18	6A	Through front lifting point
19	7	Through rear lifting point
20	7A	Through rear lifting point
21	9	Around kettle brace
22	9A	Around kettle brace
23	11	Through wheel
24	11A	Through wheel
25	12	Through wheel
26	12A	Through wheel
27	13	Through lunette
28	13A	Through lunette

Figure 2-13. Heating kettle trailer lashed to platform.

## 2-8. Installing Attitude Control Bar

Install the attitude control bar (ACB) as shown in figure 2-14.



- ① Lay an 18- by 24-inch piece of honeycomb against the fuel tank screen. The fuel hose is on top of the honeycomb.
- ② Tie the honeycomb in place with type III nylon cord.
- ③ Place the ACB on the drawbar against the honeycomb.

Use a 16-foot length of type X nylon webbing, two D-rings, and a load binder for each step 4 through 11.

- ④ Pass strap through tiedown 10 and around top ACB brace.
- ⑤ Pass strap through tiedown 10A and around top ACB brace.
- ⑥ Pass strap through tiedown 12 and around bottom ACB brace.
- ⑦ Pass strap through tiedown 12A and around bottom ACB brace.
- ⑧ Pass strap through tiedown 15 and through the ACB ring.
- ⑨ Pass strap through tiedown 15A and through the ACB ring.
- ⑩ Pass strap through tiedown 15 and around center ACB brace.
- ⑪ Pass strap through tiedown 15A and around center ACB brace.
- ⑫ Tie the cable and fuel hose to the handbrake bracket with type III nylon cord.
- ⑬ Tie the handbrake in the OFF position with type III nylon cord.

Figure 2-14. ACB installed.

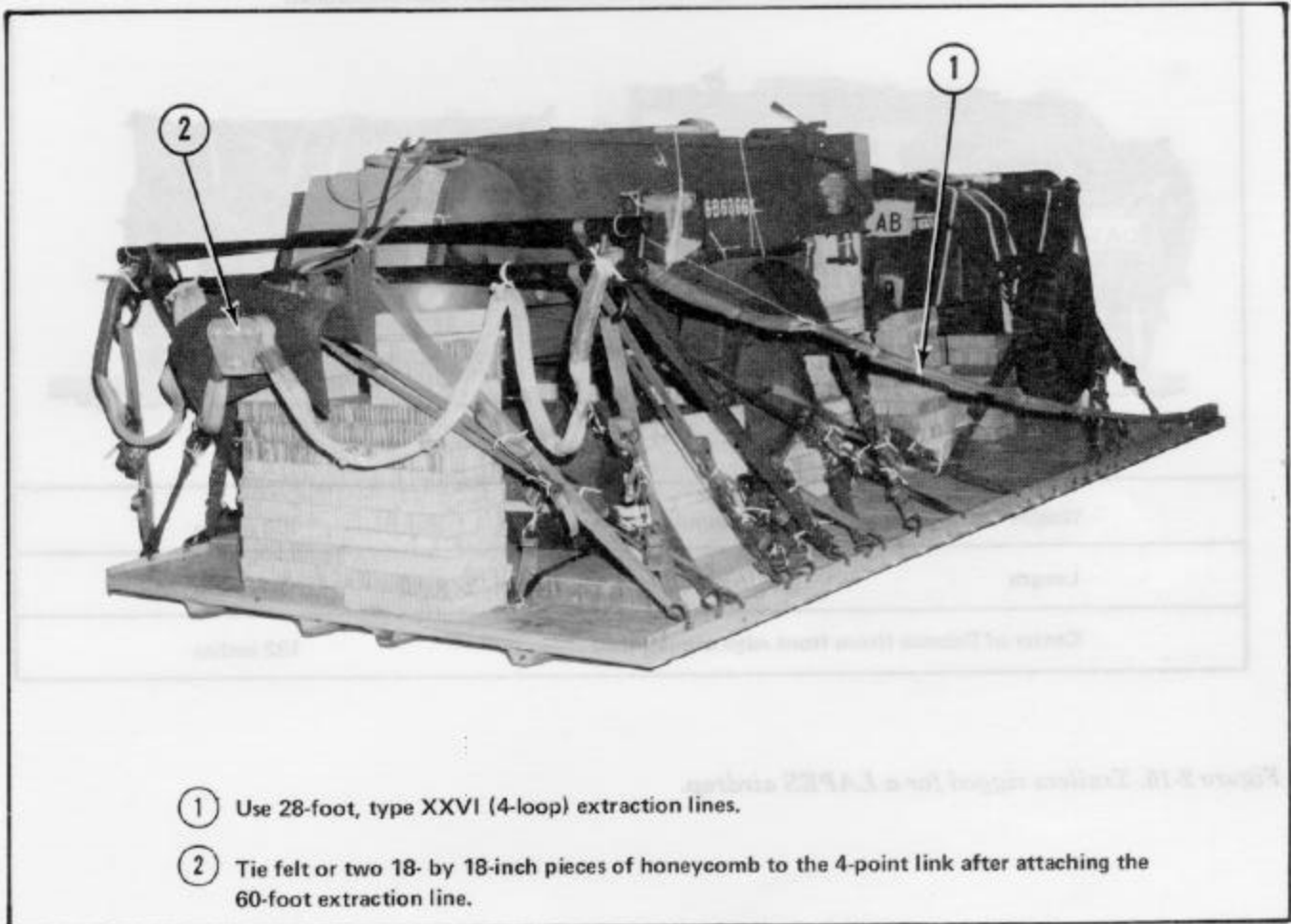


**2-9. Installing Extraction System**

Install the extraction system according to FM 10-500/TO 13C7-1-5 and as shown in figure 2-15.

**2-10. Positioning Extraction Parachutes**

Place a 15-foot cargo extraction parachute and a 28-foot cargo extraction parachute (packed for LAPES) on the load for installation in the aircraft.



*Figure 2-15. Extraction system installed.*

## 2-11. Marking Rigged Load

Mark the rigged load according to FM 10-500/TO 13C7-1-5 and as shown in figure 2-16. Use the data listed in figure 2-16.

### CAUTION

The rigged load **MUST** be given a complete final inspection by a qualified parachute rigger before the load leaves the rigging site.

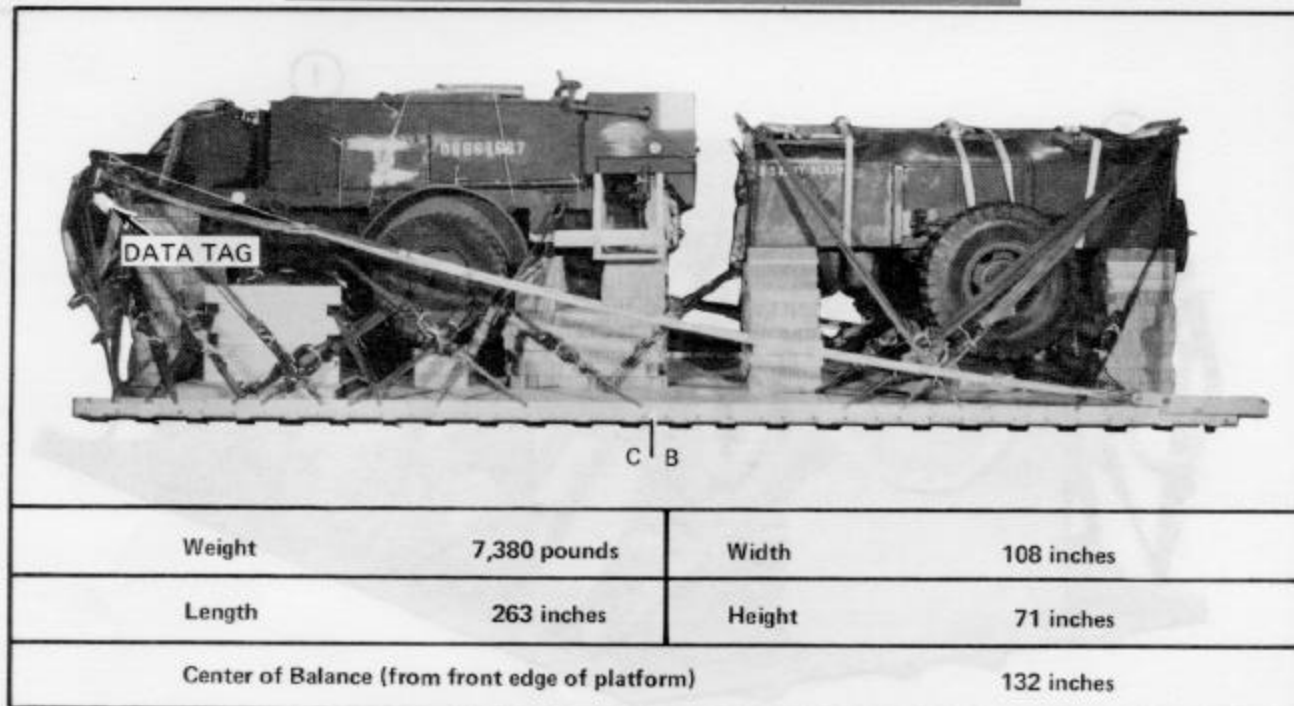


Figure 2-16. Trailers rigged for a LAPES airdrop.

## 2-12. Equipment Required

Use the equipment listed in table 2-1 to rig this load.

Table 2-1 Equipment Required for Rigging Spreader and Heater Trailers on 20-Foot LAPES Platform

National Stock No.	Item	Quantity
8040-00-273-8713	Adhesive, paste, 1-gal . . . . .	As required
1670-00-003-4389	Bar, attitude control . . . . .	1
1670-00-937-0272	Binder, load . . . . .	37
No Stock Number	Buffer, cotton, 10-in . . . . .	1
4030-00-678-8562	Clevis Assembly, suspension cargo (G-12). . . . .	2
4020-00-240-2146	Cord, nylon, type III, 550-lb . . . . .	As required
8135-00-664-6958	Cushioning Material, packaging, cellulose wadding . . . . .	As required
5365-00-937-0147	D-ring, heavy-duty . . . . .	76
1670-00-432-2513	Extraction Line, 60-ft (5-loop, 10-ply), type XXVI nylon . . . . .	1
1670-00-003-1958	Extraction Line, 28-ft, type XXVI (4-loop) (sling cargo). . . . .	2
8305-00-958-3685	Felt, ½-in thick, 72-in wide . . . . .	As required
	Link, two-point. . . . .	2
5306-00-435-8994	Bolt, 1-in diam, 4-in long. . . . .	(4)
5310-00-232-5165	Nut, 1-in . . . . .	(4)
1670-00-003-1954	Plate, side 5½-in . . . . .	(4)
5365-00-007-3414	Spacer, large . . . . .	(2)
1670-00-006-2752	Link, connector, four-point. . . . .	1
1670-00-753-3928	Pad, energy dissipating, honeycomb, 3- by 36- by 96-in: . . . . .	13 sheets
	9- by 15-in . . . . .	(8)
	10- by 36-in . . . . .	(4)
	12- by 12-in . . . . .	(12)
	12- by 14-in . . . . .	(8)
	12- by 16-in . . . . .	(14)
	12- by 36-in . . . . .	(10)
	12- by 40-in . . . . .	(10)
	16- by 43-in . . . . .	(14)
	18- by 24-in . . . . .	(1)
	36- by 36-in . . . . .	(6)
	36- by 96-in . . . . .	(1)
1670-00-052-1548	Parachute, cargo extraction, 15-ft. . . . .	1
1670-00-262-1797	Parachute, cargo extraction, 28-ft. . . . .	1
	Platform, modular, LAPES, 20-ft:	
5306-00-180-0309	Bolt (skid attachment) . . . . .	80
5306-00-180-0310	Bolt (nose bumper) . . . . .	8
5306-00-180-0097	Bolt (bridle plate) . . . . .	4
1670-00-893-1631	Clevis, load tiedown . . . . .	30
1670-00-081-6865	Nose bumper . . . . .	1
1670-00-081-6842	Nose skid . . . . .	4
5310-00-950-0039	Nut (skid attachment and nose retainer). . . . .	88
5310-00-902-9369	Nut (bridle plate). . . . .	8
5310-00-877-5796	Nut (skid nose) . . . . .	12
1670-00-081-6849	Panel, assembly . . . . .	10



Table 2-1. (Continued)

National Stock No.	Item	Quantity
1670-00-005-1587	Plate, bridle attachment, 23-in . . . . .	.4
1670-00-082-5313	Rail, platform, side, 20-ft . . . . .	.2
5305-00-045-3181	Screw (skid nose). . . . .	.12
5305-00-079-7985	Screw (side rail). . . . .	.80
1670-00-085-5608	Skid, air delivery, 20-ft . . . . .	.4
5530-00-128-4981	Plywood, 3/4-in:	
	9- by 15-in . . . . .	.2
	10- by 36-in . . . . .	.1
	12- by 12-in . . . . .	.4
	12- by 14-in . . . . .	.2
	12- by 16-in . . . . .	.4
	21- by 30-in . . . . .	.3
1670-00-937-0273	Tiedown assembly . . . . .	.13
7510-00-266-5016	Tape, adhesive, 2-in . . . . .	As required
8305-00-268-2411	Webbing, cotton 80-lb . . . . .	As required
8305-00-082-5752	Webbing, nylon, tubular, ½-in . . . . .	As required
8305-00-268-2455	Webbing, nylon, tubular, 1-in. . . . .	As required
8305-00-261-8584	Webbing, nylon, type X, 16-ft length (37 ea) . . . . .	174 yd

## APPENDIX

### REFERENCES

AFR 71-4/TM 38-250

Packaging and Materials Handling:  
Preparation of Hazardous Materials  
for Military Air Shipment

FM 10-500/TO 13C7-1-5

Airdrop of Supplies and Equipment:  
General Information for Rigging  
Airdrop Platforms

TM 10-1670-208-20&P/  
TO 13C3-4-12

Aviation Unit Maintenance Manual  
(Including Repair Parts and Special  
Tools List) for Platforms, Type II  
Modular and LAPES/Airdrop Modular

**FM 10-546/TO 13C7-33-21**

**22 MAY 1981**

By Order of the Secretaries of the Army and the Air Force:

**E. C. MEYER**

*General, United States Army  
Chief of Staff*

Official:

**J. C. PENNINGTON**

*Major General, United States Army  
The Adjutant General*

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